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Subtracting the silica and gangue, and recalculating, the following per cents. are obtained:

SO_3	34.64	per cent.
BaO	64.76	"
CaO	.50	"
Total	99.90	per cent.

The theoretical composition of barite is:

SO_3	34.33	per cent.
BaO	65.67	"
Total	100.00	per cent.

The specific gravity of the nodules was 4.55; color, ash white.

ON THE ALKYL HYPOBROMITES. R-O-Br.

F. W. Bushong, Emporia, Kan. Read before the Academy December 31, 1896.

About 10 years ago Sandmeyer first prepared and described* methyl hypochlorite and ethyl hypochlorite, but, possibly on account of their unstable and explosive nature, no further attempts were made to use them in the synthesis of other compounds.

In a study of cyanimidomethylcarbonate † and other imidoethers, undertaken about two years ago at the suggestion of Dr. J. U. Nef, these alkyl hypochlorites proved to be very valuable. Since the acid bromides are frequently much more reactive than the acid chlorides, it was to be expected that the alkyl hypobromites would be much more valuable reagents than the corresponding hypochlorites. Experiments were therefore begun in the hope of preparing such hypobromites.

Ethyl Hypobromite. C_2H_5-O-Br.

Several attempts to prepare ethyl hypobromite from alcohol and hypobromous acid, prepared in the usual way from oxide of mercury and bromine, failed.

Fifty g. potassium bromide, 25 g. caustic soda and 25 g. alcohol were then dissolved in 250 c. c. water, and put into a wide thin-walled inner tube of a glass condenser, which was closed below by a three-way stopcock. Ice-water was kept flowing through the apparatus, and the temperature of the solution thus kept below -5° C. Washed chlorine gas, free from air, was passed in through the stopcock, the apparatus being inclined at an angle of about 15° from the horizontal, so that the bubbles would rise slowly through the liquid. ‡ As the bubbles of chlorine diminished in size through absorption, small globules of a red oil grew beneath them. This oil formed a layer at the bottom, but decomposed before it could be removed from the apparatus, although if left there undisturbed and kept cold it could be kept nearly half an hour.

Ethyl hypochlorite, which floats on water, was shaken up with a dilute solution of potassium bromide, which was kept below -8° C. Drops of ethyl hypobromite collected at the bottom, but exploded instantly, though not violently, when the mother-solution was poured off. A number of schemes were tried in order to weigh a portion for analysis, but none were successful.

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* Bericht d. deutsch. chem. Ges. 19, 857.

† cf. Nef, Cyanimidoethylcarbonate, Liebig's Ann. 287, 274.

‡ Sandmeyer, loc. cit.

METHYL HYPOBROMITE. CH_3-O-Br.

A solution of 50 g. potassium bromide and 25 g. caustic soda in 25 c. c. methyl alcohol and 250 c. c. water was placed in the condenser previously described, and chlorine passed in as before, but no oil separated.

Methyl hypochlorite was then prepared and distilled into a dilute solution of potassium bromide, which was kept below -8° C. A drop of red oil would form at the end of the delivery tube and sink to the bottom, where it would soon begin to decompose, and then rise to the surface, where it would explode instantly.

It was evident from these experiments that ethyl hypobromite is more stable than methyl hypobromite. One would naturally conclude that the higher members of the series would be still more stable.

AMYL HYPOCHLORITE. $C_5H_{11}-O-Cl$.

Amyl alcohol was shaken up with a solution of 3 g. caustic soda in 300 cc. water, and after allowing the undissolved alcohol to separate the solution was put in the condenser and treated with chlorine. A layer of amyl hypochlorite was obtained. It resembles methyl and ethyl hypochlorites in being a green oil which floats on water and in having a sharp odor more disagreeable than that of chlorine gas, but it is more stable. While I was never able to keep either methyl or ethyl hypochlorites more than four hours, even when kept cold by freezing mixtures, I succeeded in keeping a sample of amyl hypochlorite in an open test-tube 24 hours, at the ordinary laboratory temperature in June. An attempt was made to distill a portion, but when heated to 75° C. it rapidly decomposed, with great evolution of heat and a strong odor of valerianic acid.

AMYL HYPOBROMITE. $C_5H_{11}-O-Br$.

Amyl hypochlorite was shaken up with a cold dilute solution of potassium bromide, and a layer of red oil sank to the bottom. It was washed by running cold distilled water through the vessel containing it, and a portion was then removed by means of a pipette, and weighed, and immediately plunged into dilute ammonia, where it very slowly decomposed. The haloids were precipitated by silver nitrate. 0.1987 g. oil gave 0.1688 g. silver haloids, which lost on heating in chlorine 0.0160 g., indicating that the oil may have been a mixture of amyl hypochlorite, amyl hypobromite and amyl alcohol or decomposition products. A loss of bromine was noticed at the time of transfer for weighing, this having been done in the extremely unfavorable weather of July. I expect to continue these experiments in cold weather, and feel confident that I can prepare alkyl hypobromites entirely free from chlorine, and make perfectly reliable analyses of them. I expect then to study their action on the isocyanides and other unsaturated compounds.

KANSAS MINERAL WATER.

By H. E. DAVIES, Lawrence, Kan.

Presented by E. H. S. Bailey, Lawrence, Kan., and read (by title) January 2, 1897.

Pure water is an artificial product of the laboratory. Natural waters always contain foreign matter in solution and suspension, varying in amount from a mere trace to a very large proportion. The properties, effects and uses of water are considerably modified by these ingredients, and the object in the investigation was to ascertain the chemical composition of some natural waters from different sections of the state.